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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

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BRANCH OF RESEARCH

October, 1930

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FOREWORD

Extract from Letter from Mr. P. M. Barr, Research Division, Department of Lands, Victoria, B. C.

"The Cowichan Lake Forest Experiment Station on South Vancouver Island is now well established and is proving a splendid centre for our silvicultural studies in the Douglas fir region of this province. The Station itself consists of about 400 acres of varied types, in which the most important is a twenty-year-old stand of fir in which we have completed the establishment of a rather important series of thinning studies. This experimental forest is situated in the centre of one of our most important lumbering districts, where logging has been going on for over thirty years, and there is a good variety of forest types which may be reached in an hour's travel or less. Three buildings have been erected at the Station, with supplementary tented quarters for the summer staff.

"At the Aleza Lake Experiment Station our group of buildings has been completed, and Mr. Griffith is making satisfactory progress with his studies of Spruce regeneration which are being supplemented by experimental cuttings. Unsettled conditions in the lumber industry are making our work rather difficult this year, but a contract has been completed for the sale of 250,000 feet of Spruce logs this fall, which will permit a small cutting area at least to be included in the 1930 work.

"The Service is getting its planting programme under way, and a forestry station has been located on the highway between Vancouver and Seattle. It consists of 600 acres of cut-over land, on a very good Fir-Hemlock-Spruce site. Our central nursery is being developed on this area, to occupy about 20 acres near the centre of the block, and a series of experimental and demonstration plantations, including a large number of species, is to be built up on the land surrounding the nursery. Our first annual planting was done last spring, when between 40 and 50 acres of Fir and Spruce were set out. We have about 140 beds of one and two year stock in the nursery, and it is probable that our planting programme will reach the objective of two million plants annually in about five years. All this work is being handled by the Research Division at the beginning, as the Service considers it should be regarded as an experimental project until efficient and economical field methods are developed, when the whole subject of reforestation will probably be turned over to the administrative staff.

"In addition to the above three stations, parties have been in the field all summer on our mensuration, regeneration, and history map studies, and the re-measurement of permanent plots. Nothing particular of new interest has developed in these three phases of our work.

"At present our staff consists of seven technical men and a foreman at our Aleza Lake Station. During the summer we have had the usual temporary assistants, of course. One of our research men, Mr. Schenstrom, is a Swedish forester, a recent graduate of Stockholm, who is assisting in our thinning work, and has proved to be of great assistance to us. He combines sound training with excellent practical experience, and has been able to adapt himself to our conditions here to a remarkable degree. At the beginning of this month we were very unfortunate in losing Mr. C. G. Riley, a graduate of Toronto and Yale, who has been in charge of the Cowichan Lake Station. He was offered an attractive position in pathological work by the Federal Government, and has gone to Quebec."

ALLEGHENY FOREST EXPERIMENT STATION

General

Mr. Munns spent the last ten days of the month with us, making a 900-mile circuit of our territory, including northern Maryland and the greater part of Pennsylvania. In the course of this trip he and Forbes visited Mont Alto attending the Forestation Conference, and also visited the Forest Research Institute looking over various plantations and experimental plots. They then looked over a portion of Catoctin Mountain, northwest of Frederick, Maryland, which is the area where the Station proposes to begin its study of fire damage. The project was explained to Mr. Klein, District Forester, and Mr. Herbert Quick, in charge of fire prevention for the State of Maryland, at a conference which was also attended by Mr. Backus from Washington. The State fire record for this area covering the past twenty years revealed a sufficient acreage which had only burned over once in that time to be suitable, in Munns' judgment, for a damage study of the kind contemplated. The Mountain suffered considerable damage from fire during the past extremely dry summer, the watershed of the city of Frederick suffering particularly severely.

At Kane, Pennsylvania, the possibilities of undertaking immediate improvement on the Kane experimental forest were considered, and a site for the proposed laboratory and headquarters building was tentatively chosen. Should funds become available, it will be possible to undertake a road improvement and building construction within the next nine months. The virgin hemlock on East Tionesta Creek proved to be something of a revelation to Munns, and some of the beech he felt to be superior to what he had seen in Europe. Munns and Forbes returned to Philadelphia via the anthracite coal region, where the fire damage of the past summer was particularly apparent.

Forbes spoke before the research staff of the Agricultural College on the federal program of silvical research, and before the student Forestry Club on some of his experiences in the Southwest, South, and East. At a dinner tendered to him by the forestry faculty, at which Dean Watts of the Agricultural College and Dr. Fletcher, Director of the Agricultural Experiment Station, were also present, he gave the opinion, in a reply to a question, that the most pressing need of the forestry department at Penn State is for an experimental forest, if the college is to develop research work by faculty members. He made particularly plain that such an experimental forest should contain timber now merchantable, in order that an immediate program of management research could be put into effect. At present the College controls only a few small wood lots, in which planting is the most pressing problem. The suggestion of an experimental forest seemed to meet with considerable interest from both Drs. Watts and Fletcher. Forbes learned from Dr. Weaver of the Department of Agricultural Economics that the College plans to hold a conference on farm land abandonment in the spring. Forbes feels that the foresters will not be overlooked at this

conference. A bulletin recently published covering the economic survey of Wyoming County did not mince words when referring to certain portions of the County as of low value for agriculture. About a third of the County is shown as unfit for agriculture.

Forbes spoke on the work in forestation of the eastern Federal stations at a forestation conference held at Mont Alto. Among the speakers from outside of Pennsylvania were Professor Toumey of Yale, Professor Spring of Cornell, and State Forester Howard of New York. Perhaps the most interesting speaker at this conference was a Mr. Elwood Burgess, of Windber, Pennsylvania, who is manager of about 43,000 acres owned by bituminous coal operators. The fact that his clients have planted 16,000 acres in the past few years is not as important as that they are making an effort to practice real forestry in the remaining timber on this property, and are apparently depending on clever marketing of the products of their two small sawmills to make the forestry operation pay. Mr. Burgess has made a thorough study of the markets for hardwood, and is selling at a profit material of incredibly small sizes.

Morey made some very interesting extracts from the scrap book of the late Henry Baxter, formerly proprietor of a sawmill near Heart's Content, on the Allegheny National Forest. Among these excerpts is one attributed to Mr. E. Fitch, esquire, in 1876; "Harry Bryan made a complete failure in trying to get rich at lumbering, as did three out every four of those who engaged in lumbering in those days." The reference is to the late Thirties. Mr. Baxter's rather painstaking account of timber conditions in certain sections of Pennsylvania may prove of real value to the Station in our present study of forest types and forest succession. For example: "From Bells Mills eastward the appearance of desolation is heightened by the fallen timber which for many miles has been blown down by the tornadoes that have visited this part of the country. There is this peculiarity in the manner in which the timber falls when prostrated by the tornado or whirlwind. In this instance the course pursued by the tornado was nearly in an eastward direction. The circular motion of the wind was 'against the sun;' consequently on the east side of the 'whirl' the wind was moving eastwardly, and therefore, all the fallen timber lies with the top to the north, and they usually lie as nearly parallel with each end as they would if carefully laid there with human hands. Thousands of acres of timber lie prostrated in this manner, and the tract extends a good many miles along the valley of the Sandy Lick. Wherever living timber is standing it is pine and stands so thick that from the railroad it looks as though it were all pine".

Among our visitors at Philadelphia this month have been E. R. Linn, a Yale forester of 1913, now with the Extension Department of the Appalachian Hardwood Club. Linn states that the Forest Service's statements concerning the killing of chestnut by the blight have been

so universally accepted that many architects in Philadelphia and New York are tremendously surprised to find that chestnut is still available. He maintains that there are still enormous supplies of chestnut standing in the southern Appalachians, and that our well-meant propaganda of the past concerning the disappearance of the chestnut is making it extremely difficult to sell this lumber.

Mr. Jackson moved his office into the rooms at 3436 Walnut Street which have been placed at our disposal by the Botany Department of the University.

Forestation

Wood, Schnur, and Clapp have collected at Camp Ockanickon a small quantity of seed of both shortleaf and Virginia scrub pine. This seed will be sent to the nursery of the State of New Jersey, and there used to produce planting stock for future planting at Camp Ockanickon.

Management

In addition to a formidable collection of plot data, Hough brought back from East Tionesta some samples of duff, which he has examined somewhat minutely for the seed of trees and other vegetation, and which he is germinating in the greenhouse of the University. Dr. Fogg of the University tentatively identified a considerable collection of herbarium specimens from the Tionesta tract.

Wood and Clapp have collected about 50 seed samples of chestnut oak at Camp Ockanickon, from trees ranging in diameter from six-tenths of an inch to eighteen inches. This seed was stored under natural conditions, and will be examined during the fall to note any variation in germination among the seed from trees of different sizes. Total counts are being made of the acorns underneath the trees provided with squirrel guards, and counts of acorn cups on the twenty square feet under each of the seed trees first located and described in the fall of 1928.

Mensuration

Morey, with considerable help from Schnur, Hough, and Cary, obtained a very satisfactory amount of age data at Heart's Content. Those stumps which presented no particular difficulties in the way of distinguishing annual rings were counted in the field, and sections were cut for office examinations from stumps where this was not possible. It is rather disturbing to discover that a younger age class of white pine exists at one point in Heart's Content. This is in the neighborhood of 160 years old, as contrasted with what appears to be the main body of the stand, about 260 years old.

Morey has been preparing some detailed maps showing the location of the stumps from which he cut sections last summer for Dr. Douglass. Copies of these maps will be sent to the Doctor along with the sections cut from the stumps.

Schnur made a round of the bituminous coal region in an endeavor to learn all that is necessary to know about mine props before attempting to prepare oak volume tables in mine prop units. He also paid a week's visit to the Pocono Lake Preserve, where Mr. Cary is cutting props for the anthracite mines. These mines prefer to buy their props by the ton, rather than by the piece, as is the custom in the bituminous region. Forbes having earlier in the month discovered that the Pennsylvania State College has been collecting a good deal of data on mine prop utilization in the neighborhood of State College, Schnur visited that point and collected additional measurements on about 180 red maple trees, actually cut into props. He discussed with Mr. McIntyre of State College, the possibility of cooperation between the College and the Experiment Station in the publication of mine prop volume tables. The attitude of the College toward cooperation could not be improved upon, and in fact we were almost embarrassed by their generosity; they offered to turn over to us, for working into a suitable table, all of their volume table measurements, amounting to several hundred. We hope to persuade the College that the preferable way will be for us to work on the tables jointly, and have the results appear in a college or experiment station publication as the work of both units in cooperation.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Major Stuart and Mr. Kircher visited the national forests in North Carolina and Georgia during the month. They also visited the Station and the Bent Creek Forest.

Forest management study in north Georgia

Two sets of permanent plots were established during the past month by the Georgia party (Hursh, Abell, Stone, and Daley) on the land of the Georgia Mountain Experiment Station near Blairsville, Georgia.

One set of plots is to study the effect of a fuelwood sanitation cutting on cut-over woodlots. The area treated will consist of about two acres. The trees marked for cutting will be removed. A record will be kept of the cost. Scarlet, black, southern red, and white oak make

up the stand with an understory of sourwood, black gum, and dogwood. In marking trees for cutting southern red oak and vigorous white oak were favored whenever possible. The stand is representative of a considerable area of woodlot forest in North Georgia.

A second set of plots is to study the effect of thinning a pole stand of white and red oaks. Such stands are of common occurrence in the region and field observations have been that in most cases such stands produce slow growing whip-like trees, unless heavily thinned. The total area thinned will be over one acre. Southern red oak, northern red oak, and white oak have been favored in marking the stand for thinning over post oak, scarlet oak, and black oak.

Field observations have been that young reproduction less than one inch d.b.h. is uniformly satisfactory throughout the cut-over areas north of the Blue Ridge in Georgia. Southern red oak, scarlet oak, black oak, and white oak predominate in the reproduction, followed in abundance by post oak, hickory, and northern red oak.

In this particular region fires have not been serious during the past ten years, due to the fact that most of the land is in large holdings and under adequate protection. Undoubtedly this fact has been of major importance, accounting for the existence of young reproduction in the region. However, there are apparently other factors of importance which have not yet been recognized.

The Georgia party remeasured the Sosebee Cove, Cherokee Forest, yellow poplar stand studied by McCarthy in 1923. This is an old-field stand, fifty to fifty-five years old, situated in a high north cove. The trees average about 122 feet in height and contain over 50,000 board feet per acre. In 1923 McCarthy estimated the stand as containing 45,708 board feet per acre. Other poplar stands of similar growth, but of much larger area, are being studied by the Georgia party.

Loblolly pine

Korstian, MacKinney, and assistants reexamined the reproduction quadrats on the selective logging plots which were established last fall at Franklin, Virginia; and Windsor, North Carolina.

The unmerchantable hardwoods which were poisoned and girdled on the Franklin plots this spring were examined. Those which were poisoned by applying sodium arsenite in a ring of single axe cuts showed a high percentage of mortality, while those which were girdled by removing a strip of wood 2 inches wide and 2 inches deep around the tree, but not poisoned, did not show such high mortality. The oaks were more easily killed in both treatments than the red maples, hickories, and the black and red gums.

Observations of the seed crop in the Coastal Plain region of the Carolinas indicate that loblolly pine has a relatively short crop following the very heavy one last year. The longleaf pine seed crop is also rather light. Most of the pond pine trees noted had a large number of cones maturing this year. Tupelo and swamp black gum were bearing heavy seed crops, as were the willow, water, laurel, and live oaks.

On the plots where all unmerchantable hardwood trees were felled following logging last fall the sprouts from the stumps 6 to 14 inches in diameter were in most cases very thrifty. Some of the yellow poplar sprouts were 8 feet high at the end of the first growing season. Most of the sprouts of other species were smaller but nevertheless vigorous.

Thinning Southern pines

Three thinning plots in shortleaf pine which were established by the Forest Service in 1911 on the Page estate, north of Richmond, Virginia, were reexamined. The results will soon be included in a short article.

An interesting plantation of slash pine was visited on the Southern Railway Demonstration Forest at Pregnall, South Carolina. The trees were grown one year in the seed beds and then field planted in the spring of 1926 on a fairly dry old field. The stand is now closing rapidly and contains many trees ranging from 12 to 17 feet in height and 1 to 3 inches in diameter at breast height. Several natural specimens of Pinus sondereggerii were found on a nearby old field.

Controlled burning in Southern pines

The quadrats on the controlled burning plots at Lanes, South Carolina, were examined by MacKinney and party during the latter part of the month. The burned plots have been burned for three consecutive years and are showing a marked difference in condition and amount of tree reproduction and ground cover from the unburned plots.

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Nelson and Sims returned to McFalls Creek, Natural Bridge National Forest, for two weeks' additional work on the study of the correlation between cambial damage and external discoloration caused by fire on hardwoods. The ultimate goal of the work is a basis for the evaluation of the fire damages chargeable to basal wounding. This form of injury has long been recognized, but collection for it on a bill of damages has been difficult.

Forest pathology

Dr. Spaulding, Forest Pathologist at the Northeastern Station, Dr. Carl Hartley, and Nelson, with the members of the Coastal Plain field party, examined slash in the vicinity of Franklin, Virginia. Spaulding, Nelson, and Abell also examined hardwood slash of different ages on the Pisgah National Forest.

Dr. Spaulding says in a memorandum on the trip in the Coastal Plain:

"The rate of decay here is evidently so rapid, and the evidence is all so strong that water logging probably prevails that it does not seem that lopping would be an efficient measure. Because of the rapid decay, lopping could not very materially hasten the passing of the extreme danger point. On the other hand, the probable prevalence of water logging might be a feature that would be worth considering in connection with its influence on reducing the fire danger, since it favors the formation of a wet, compact layer of slash which normally would dry out very slowly."

Of the mountain hardwood slash he says:

"All dead twigs, leaves, and branches below one inch in diameter constitute a real fire danger. These rot and disappear in three years in all of these timber species which are most numerous in the stand. It can, therefore, be said that in most places the extreme fire danger is over in three years. Slash is not usually dense. In most cuttings some shade is left. The best timber and the densest slash are on the cooler and moister slopes. It does not seem that lopping can decidedly shorten the already short rotting period, and in this situation it may lead to water logging.

"On warmer and dryer slopes lopping may hasten decay without water logging but at rather high cost. There is also danger of intensifying fire damage from more compact slash. On these slopes the fire danger continues longer in the number of years and in the length of season during the year."

Biological survey

An unexpected epidemic among the deer in the Pisgah Game Refuge has given the national forest force considerable concern. Burleigh is not sure of the cause. The finding of a reasonably fresh specimen will be necessary before more work can be done. He attended a meeting of the entire personnel of the Pisgah National Forest where a discussion of the matter was held. Cans half filled with formaldehyde for the collection of deer stomachs were distributed. Full cooperation in the study of the food habits of deer in the Southern Appalachians was promised. The hunting season opened on November 1.

Rodents are to be trapped intensively on the Bent Creek area during the period of seed fall. Stomach examinations will show their food habits and will tell something about the relation of these animals to forest tree reproduction.

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CALIFORNIA FOREST EXPERIMENT STATION

General

The annual meeting of the State Chamber of Commerce in San Francisco was attended by Kotok and Hill. The conservation section meeting was keenly interested in the work of the Station.

Kotok has spent considerable time during the month on fire, first in a conference at this Station with Gisborne of the Northern Rocky Mountain Station and McArdle of the Pacific Northwest Station, and at the last of the month with the Regional Board of Fire Review. During the month two of the new men for fire research reported for duty, J. R. Curry, who comes from the position of Assistant State Forester in charge of fire control, Maryland, and A. A. Brown from the Jefferson Forest, Region 1.

Hill visited the annual ranger training camp held at the Feather River Branch of the Experiment Station.

Management

Reexamination of the older Mc plots was completed October 30 by Hasel, Agri, and May. Failure to muster a second crew as expected made it necessary for the party to remain continuously in the field since late April. Fourteen plots measured have been under observation for 20 years. One new plot was established in virgin timber and considerable work was done on 5 other new plots, checking maps after logging and slash disposal and setting permanent stakes. Mil-acre reproduction quadrats to the number of 1580 were recharted, 800 of them for the 20th season. Sixty-five chains of seedling transects were also reexamined.

Cover Types

In September we were visited by Mr. Granger, who scrutinized our cover maps with a view toward their use in the Forest Survey. Woodbury and Dunston of the Regional Office and Kotok and Wieslander of the Station met to discuss ways and means of adapting the cover type map to the needs of the Survey. It was decided in future field work to secure certain data in addition to the types, on cut-over land and

burns, timber site classes, and non-commercial timber areas. Wieslander, in company with Dunston, followed this up by a trip to the Sierra, Stanislaus, Mono, Inyo, and Eldorado forests, where these proposals were discussed. The securing of these additional data means material slowing down of the work in timbered areas, but will be more economical in the end by eliminating the necessity of reworking the areas later.

Wieslander and Woodbury went to Portland to see the progress of the Forest Survey in the Douglas fir region. No efforts were spared by the Survey organization to make their trip profitable, and they returned feeling that much had been gained that would be helpful in preparing the way for the Survey in California.

Wieslander is making an inspection of the field work in progress on the Sequoia and Santa Barbara national forests and in outside areas in Kern and San Luis Obispo counties. He is also making arrangements with the State organization for assistance this winter in the work in southern California. The following cooperation has been volunteered:

1. In Kern County the State Ranger will provide a car and assist our man in continuing the work in Kern County as soon as fall rains relieve the fire situation.

2. In Monterey County the State Ranger will provide transportation during January and February to complete the mapping of that county.

3. In Riverside County the State Ranger, beginning January 1, will assist our man and will also provide transportation until all areas in Riverside County outside of national forests are mapped.

4. In San Diego County at least one man and possibly two, including transportation, will be provided for a three or four month period beginning January 1.

Botanical discoveries made by type-mappers in the past two months are: the southernmost distribution of Pinus muricata and Cupressus sargentii; the former near the coast at about the middle of San Luis Obispo County; the latter in the San Rafael Mountains at about the center of Santa Barbara County; Ademostoma sparsifolium, a tall fast growing species of this chamise brush genus, was found fifty miles northwest of its generally known range, in the above two counties. This species, which is very common in northern Mexico, ranges northward to the Cleveland Forest and San Jacinto Mountains of southern California. Here its continuity ceases. A small area occurs northwest of Los Angeles in the Malibu Mountains, which we supposed until this discovery to be the northern limit of the species. The remarkable fact is that this species does not occur in the San Bernardino and San Gabriel Ranges, adjacent to the San Jacinto Mountains, and yet appears again far to the northwest of them.

Field Conference on the Relations of Water, Soil, and Vegetation

Dr. Lowdermilk called an informal field conference on Forest Influences and Erosion. The object of the conference was similar to that of the one in September, 1929, namely to bring into consultation specialists who are conducting experimental studies in allied fields, for a consideration of the instruments designed and installed last year and of plans for further studies in determining the disposition of meteoric waters, with special reference to direct evaporation and transpiration by vegetation. An attendance of about 15 was expected, but 35 came to the conference.

Stops were made at various experimental installations designed to measure evaporation and transpiration instrumentally, or by soil sampling. Problems involved, features of installation, and technique in experimentation were fully discussed.

Installations of the Division of Agricultural Engineering of the Bureau of Public Roads, which were visited, are measuring transpiration loss through grass vegetation with water tables within 2 and 4 feet of the surface. Methods of sampling coarse and rocky soils on the valley floor for moisture content as affected by natural brush vegetation in comparison with cleared areas were discussed in detail on sampling sites. Soil sampling for moisture remains the most dependable measure of the use of water by vegetation during the rainless season. Soils of the outwash fans, being rocky, present difficulties in manipulation. Soils on the mountain slopes, which fall within the domain of the Forest Experiment Station, present additional difficulties in manipulation. It was decided, however, that large samples, where volume weights are determined, will answer the required questions satisfactorily. For,

$$D = p. v. d.$$

where D = equivalent depth of water in inches; p = moisture per cent; v = volume weight; and d = depth of the sample in inches. It is not considered necessary to screen samples into fractions when the volume weight is determined. This method was accordingly considered satisfactory for use in moisture determinations. Sampling in pits will be continued as the only feasible method in rocky soils.

The possibility suggested by Lowdermilk of increasing the water yield of Devil Canyon watershed for city use of San Bernardino by robbing canyon bottom vegetation (chiefly alders) of water by piping out the water, was viewed with great interest by the conference. When surface flow of the canyon is collected and passed through pipes the streamside alders promptly die. Provisions were made to study experimentally the comparative yield of water from a canyon in the open channel and through pipes.

Installations for studying the effectiveness of rain and the lysiphytometers were considered and were judged to be necessary.

On the second day of the conference a trip over the road to the high tableland of the San Bernardino Mountains gave opportunity to see and discuss the profile vegetation, soil, and root development in road cuts over an altitude of about 5000 feet. Studies of plant succession following fires were described by Kraebel at the Panorama installation in the presence of an excellent example of the quick return of Quercus dumosa following a burn.

A need for an accurate and simple method of detecting the beginning and end of growing seasons in varying altitudinal zones became apparent in the discussions. A number of methods were considered, some of which are to be tested.

The conference brought into relief that, apart from all other considerations, such as accelerated erosion following destruction of vegetation, the possibility of increasing water yield from southern California watersheds by manipulation of vegetation on drained slopes is complex and requires careful study before any important action is undertaken.

Tank Experimentation

Experimental runs with the Aiken soil sample at the soil and road erosion tank installation at Berkeley are nearing completion. The series of runs with tanks set at gradients from 5 to 20 per cent have been completed. The series of runs with all five tanks at uniform gradient are nearly complete.

In preparation for another series of runs with a different soil, a trip was made by Lowdermilk and Sundling in company with Forest Supervisor Frank Price of the California National Forest to select a site for sampling soils derived from serpentine rock. Such soils exhibit high erosivity when bared in road construction. During the month Sundling directed the sampling and collection of approximately 17 tons of this soil and shipped it to Berkeley preparatory to refilling the erosion tanks, after the Aiken soil is removed.

Water Relations

All installations in southern California were put in condition for the rainy season by Lowdermilk. The first rain of the season occurred on October 9 when falls from 0.5 inch to 1.2 inches fell, varying with altitude and locality. Dry, warm weather followed, which caused grasses to begin growth, filaree to sprout, grow, and blossom, and chamise, which had been cut during the summer, to sprout. This storm was not effective as a water supply producer. Only shallow depths of soil were moistened. This moisture was soon withdrawn from the soil by evaporation or transpiration. No run-off occurred on experimental plots.

500 Cubic Inch Graduate

To permit the measuring of water accurately in cubic inches, required for the lysiphytometers, a 500 cubic inch graduate was designed and made. This piece of equipment calls attention to the great waste of time and labor involved in calculations required by the shackles of our cumbersome English system of measurements. It is probable that time would be saved if work were done in the metric units and the results converted into the units of common use in the United States. Another relief may be in the adoption of the foot as the unit as is done in surveying.

The measurement of rain to hundreths of inches is an unnecessary refinement. Rainfall in the greater part of the world is measured in millimeters as the smallest unit. Thus a thousandth of a foot, being larger than a hundredth of an inch but still less than a third of a millimeter is quite small enough as a unit of measurement. In fact the variations in catch of rain by gages in close proximity are so much greater than hundredths of an inch that averaging to hundredths becomes a useless refinement. In hydrology and engineering the yield of watersheds or flow of streams per area unit is most conveniently expressed in terms of acre feet. The advantage of having rainfall measured in decimals of a foot for conversions in this field is obvious.

Products

Lumber Depreciation

The first installment - or perhaps the first two installments, depending on the amount of space the trade journals will allot - of the report on lumber degrade and remanufacture was completed during the month. This covers a brief resume of the meagre data previously available in the California region, a full discussion of methods used in the present studies, interpretation and application of results, general comments on the status of seasoning practice, and a complete account of white fir depreciation from green to rough dry, remanufactured to realize maximum values. Three charts and eight tables show the changes in grade and value from green to dry before and after trimming and ripping to raise the grade, and the causes of defect, for both air dried and kiln dried material.

Preparation of the white fir value data has been an onerous task because of the lack of selling price statistics for different sizes of C & Btr. and for each of the first three common grades. Two sets of calculations were made, one showing the results on the basis of available statistics, i. e., one price for all widths and thicknesses of C & Btr., and one lump value for 3 & Btr. Common, and the other on the basis of assumed value differentials between different grades and sizes, adjusted so as to give weighted average selling prices approximately equal to the statistical lump values.

In air dried white fir the greatest degrade, 48% by volume (before remanufacture), occurred in 1" x 12" #2 Common. The least was 3.0% in 2" x 4" C & Btr. For all grades and sizes combined, the weighted mill-run loss in original green value was $.92 per M feet or 4.3% on the basis of present selling practice and $1.15 per M feet, or 5.3% on the estimated separate price basis. The average degraded volumes depreciating in value were 10.7% and 18.3%, respectively. If No. 1 Common has no greater value than #3 Common, and it does not when sold as #3 & Btr., then there will be no value depreciation in the portion dropping to #2 or #3 Common during seasoning. This explains the difference in results between the two systems of figuring.

The above losses were reduced from $.92 to $.18 and from $1.15 to $.45, amounting to 0.8% and 2.1% of green value, respectively, by trimming and ripping for the best possible yield of higher grades commensurate with cost of remanufacture and footage losses. In actual present practice, remanufacture of white fir is not so intensively done as it was in the studies. The final net losses given above include the average cost of remanufacture per M feet of green material. This amounted to 14 cents, using a cost figure of $1.30 per M feet for material ripped and trimmed. The ratio of volume trimmed to volume ripped was about 2 to 1.

The maximum degrade volume in kiln dried white fir 1-5/8" thick was 10%. The kiln dried material so far summarized was not as dry as that inspected in the yard, however, so too much significance should not be attached yet to the comparative results between kiln and air seasoning. Later we will receive more summaries from the Madison tabulating machine showing the results of special tests in which white fir was allowed to remain in the kiln until the lumber could be classified as reasonably dry at least. When these have been computed, we will know whether or not kiln drying of white fir is a paying proposition, but no valid conclusion can be drawn from the depreciation data for "half-dried" material except the matter of fact statements that kiln drying degrade in 1-5/8" fir is about 6% in the average, before remanufacture, when dried according to prevailing practice. After remanufacture, the degrade was 3.4% by volume and loss in footage was 3.2%. The loss in original value was $.21 per M or 0.9%. This is based on a distribution of grades kiln dried of 5% C & Btr., 15% #1 Common, 25% #2 Common, 45% #3 Common and 10% #4 Common.

Mill Study

The first summaries of the milling study have just been received from Madison and computing will begin shortly.

The check on green chain grading is about finished. Errors vary considerably with thickness in the upper grades. Generally speaking, the uppers are marked too high by the green graders and the lower grades are marked too low. Remanufacture of uppers restores many of the original grades as marked on the boards for the mill study tally men, but of course reduces the footage tallied. Just how this compensating feature works out in the end has not yet been determined.

Consulting Entomologist

The first part of the month was spent in assisting Mr. Miller in the work of moving the supplies and equipment from the Palo Alto office of the Bureau of Entomology to the new quarters in Giannini Hall at Berkeley. The preparation of reports on the past season's field studies occupied the remainder of the month.

Person, with the assistance of Bacon, made a preliminary analysis of the data from the biological control studies and prepared a report on the insect conditions on the Happy Camp - Lava Bed area of the Modoc National Forest. Some time was also spent in supervising the working up of the reports being prepared by the summer assistants.

The assignments of Durbrow and Furniss are terminated this month and they have completed reports on the special studies which they have been working on in the field. Durbrow has prepared a report on the H-ion concentration of the inner bark of western yellow pine in its relation to tree selection by the western pine beetle and has redrafted the maps of the Devil's Garden and Timber Mountain experimental areas. Furniss spent the month on the preparation of a report on the slash studies which he worked on at Hackamore and in work on the forest insects collected this summer. He plans to return to Syracuse the first of the year to complete his work in forest entomology.

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CENTRAL STATES FOREST EXPERIMENT STATION

Ohio Valley Section - Society of American Foresters

The staff of the Station took an active part in preparing for the meeting of the Ohio Valley Section, Society of American Foresters held in Ohio October 23 to 25. The meeting was called at Chillicothe and the field trip extended through the southern and southeastern parts of the state. Three of the state forests were visited. Among other things exhibited to the Section was an even-aged stand of yellow poplar thirty eight years old containing forty-five cords of peeled wood. The purpose of this visit was to explain to the Section members the construction and use of yield tables for this species. A plantation of yellow poplar on one of the state forests thirteen years of age, over forty feet in height and having many trees six inches or more in diameter was shown the Section. The largest tree was slightly over 8 inches in diameter at breast height. This plantation exhibits the possibilities of planting, in favorable sites, old fields which had been tilled and abandoned. The Section had opportunity to see a charcoal pit in southern Ohio during the firing operation. This pit contained about thirty-five cords of wood. The operator claimed a

favorable return from the sale of charcoal alone. Even-aged second growth stands of oak were seen in several places, since the section visited was the center of the former charcoal iron industry.

The most attractive feature of the Section meeting was the exhibition of planting with the Champion Duplex Reforesting Machine. This machine is manufactured by the Champion Sheet Metal Company of Cortland, N. Y. and is designed to simultaneously plant two rows of trees at definite intervals. The machine is tractor-drawn and capable of operating in comparatively heavy cover of weeds and brush up to two and a half inches in diameter. The machine was operated by three men, two of whom fed plants into the machine. The speed and efficiency with which this machine operates promises to materially reduce the cost of artificial reforestation over a large part of the sites in need of planting.

Yellow Poplar Study (TS-375)

Early in October Kellogg and Barrett established two plots in southern Ohio along the route to be taken by the Ohio Valley Section of the Society of American Foresters on October 24 and 25. The first of the plots was established in a 38 year old stand of yellow poplar, having a site index of 89 or just slightly below the average site for this species. A comparison of the plot values with the normal yield table figures gave the following interesting results.

Factor	Plot Value Per Acre	Yield Table Value Per Acre	Deviation from Normal Value Per Cent
No. Living Trees over 4.5" D.B.H.	365	241	+ 51.4
B.A. sq.ft.Trees over 4" D.B.H.	152	121	+ 25.6
Merch. Cu. Ft. Peeled Vol. 1 ft. Stump, 3" top	4008	3106	+ 29.0
Bd. Ft. Volume Scribner Dec.C. 1 ft.Stump,6"top Trees 8" D.B.H. and over	14280	11681	+ 22.2

This stand contained forty-five cords of peeled pulpwood per acre.

An interesting fact in connection with the plot was the large number of trees which had died during the growing season of 1930. In normal stands the average mortality for an average site between 35 and 40 years of age is 16 trees per acre for the 5 year period. This includes only those trees over 4.5" D.B.H. On the plot 108 trees per acre died during the past season. This mortality was probably due to both over-crowding and drought. The fact that many of the trees, which appeared to be dead from observations of the crown, showed green inner bark, leads to the interesting question of whether such trees will leaf out again next spring.

The second plot was located in a 40 year old stand of white oak.

Grazing Study (Pa-1)

Day and DenUyl visited the Pinney Purdue farm in LaPorte County, Indiana during the first part of the month. This experimental farm of the Purdue Agricultural Experiment Station has about 50 acres of oak hickory woods which were found suitable for carrying on a study to determine the actual carrying capacity of this type of farm woods. The possibilities for such a study were thoroughly discussed with the superintendent of farms and the head of the Animal Husbandry Department of the University. A working plan for the study is now being prepared. This study if approved will be the second cooperative project which this Station has initiated with the Purdue Agricultural Experiment Station.

Plantation Study (Fp-1)

Kellogg has made material progress in preparing the map record showing the locations of black walnut plantations and of those bearing plots. A map is being prepared showing the location of all known walnut plantations. In Illinois, these group for the most part on the Wisconsin drift sheet in central and eastern portions of the state. This is also the region of largest original prairies in the state.

Extension Forester Sawyer in Illinois reports a curly-grained black walnut tree. Effort is being made to propogate it vegetatively. Similar work has been done by Mr. Wilkinson, a nurseryman near Rockport, Indiana. He claims that the valuable curly figure has been carried over by budding and that subsequent growth displays the curly grain.

It is time for a concerted action to find, save and propogate specially rapid growing trees, valuable grained trees, and valuable nut varieties. Unless they are advised and made known, they are lost through local cutting or accident.

Miscellaneous

Seed Crop-Ohio Valley

A heavy crop of chestnuts occurred in Ohio this year. Nuts first appeared in the market about October 10. Because of the supply, the retail price has been as low as 15¢ per pound.

The crop of black walnuts has been moderate in Ohio. In the plantation belt of Illinois there is practically no nut crop this year. Plantations in Iowa bear a moderate crop in some localities. The seed crop of white oak is good in Ohio. In one or two localities the chestnut oak acorn crop was found to be abundant. Beech trees were observed by

Barrett to be bearing a few seed. The other oaks and hickories bear about an average seed crop. A promising crop of pawpaw fruits in May was cut down by the drouth to a very poor crop by October. A few persimmons have been observed in favored localities. In the few stands of hemlock in Ohio, a very light crop of cones was produced this year.

Phenology

At the very end of the month, McCarthy noted that pitch pine cones were just opening, shortleaf pine cones had already opened, and the yellow poplar keys were half shaken out of the strobiles. On October 12 Kellogg observed that the white pine cones were opened on the Clear Fork of the Mohican River. Norway spruce seed was observed in several localities in Ohio. This opened and shed during the week of October 12. A special effort to collect these would have yielded several pounds of seed of this species.

Forestry at Ohio State University

Forestry at the Ohio State University has been given a new lease of life by the arrival of E. G. Wiesehuegel to take charge of forestry instruction in the University. Wiesehuegel finds during the first month of his service here that there are some ten Sophomores and approximately twenty-five Freshmen in the Ohio State University who are planning to complete a course in forestry. There is no doubt that with successful handling of these students, this number will automatically increase without other advertising.

Eight kilograms of butternuts and one kilogram of white ash seed were collected and shipped to the Director of the Niponese Forest Experiment Station at Keijo, Japan.

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LAKE STATES FOREST EXPERIMENT STATION

(July, August, September and October)

The study of soil erosion begun in southwestern Wisconsin early in 1929 in cooperation with the Wisconsin Agricultural Experiment Station reached a conclusive stage with the recent publication of Wisconsin Research Bulletin No. 99, "Soil Erosion - a Local and National Problem". The important conclusions in the bulletin are:

1. In hard, heavy rains, such as occur frequently in southwestern Wisconsin, the run-off from corn fields and closely cropped pastures may be as high as 50 per cent of the rainfall. It is considerably reduced under crops of hay and under a heavy cover of grain, and may be much less

on sandy soils than on the silt-loam soils which prevail. Under good forest cover, even with the most violent rainfall, the run-off rarely exceeds 5 per cent.

2. Measurable soil erosion, as evidenced by active gullies, is proceeding in the worst localities at the rate of 4,000 to 40,000 cubic yards per annum per square mile. This takes no account of more general sheet erosion from fields which can only be measured in terms of stream loads.

3. The loads of silt carried by the streams of southwestern Wisconsin tributary to the Mississippi River show best the general extent and seriousness of the loss of fertile soil, although measurements of these silt loads have not yet been extended to cover the high flood stages of streams when enormous amounts of material are brought in from every source. On the basis of all observations made during 1929 and 1930, however, it is estimated, probably on a very conservative basis, that some 25 million cubic yards per annum are brought to the Mississippi River by the streams of southwestern Wisconsin from the Chippewa to the Wisconsin Rivers, inclusive, and from a small area of similar topography on the Minnesota side, in all embracing some 10 thousand square miles. This represents sufficient soil to cover a section of land to a depth of 24 feet.

The new investigations in 1930 have been devoted mainly to the sources of run-off water with special reference to table-land farms and to the silt load of streams. In addition a number of erosion control projects were installed by the Department of Agricultural Engineering cooperating with individual farmers and by the Forest Experiment Station in cooperation with the Highway Department of Buffalo County. There are now about 40 erosion control projects in southwestern Wisconsin representing a variety of physical conditions and including both field terracing and the construction of soil-saving dams.

A meeting of the Advisory Committee was held October 9 at Marquette, Michigan in conjunction with a two-day conservation conference sponsored by the Upper Peninsula Development Bureau. Leading timbermen, foresters, farm experts and sportsmen from all of the Lake States were present. Constructive resolutions were passed at the Conservation meeting, including recommendations for agricultural zoning, for improvements in the forest tax law, for increased federal and state acquisition, and for well planned recreational development. During intermissions trips to the Upper Peninsula Branch Station at Dukes were arranged and visitors were given an opportunity to see the results of several kinds of selective logging as well as some of the other work of the Station. Much favorable comment was bestowed upon the Director and his accomplishments. Mowat, Roe and Templin from the Station made a contribution to the meeting in the form of evergreen boughs and bright colored foliage with which they decorated the hall.

Disastrous forest fires during recent years in Wisconsin have brought to the fore the problem of the fire danger from slashings left after logging operations. Drastic legislation was proposed during the legislative session of 1929 to combat this special fire menace. The lumbermen considered the proposed legislation too drastic and not based on sufficient facts. It was finally agreed that before any adequate legislative measures dealing with slash disposal could be enacted, a study should be made by the Lake States Forest Experiment Station in cooperation with the University of Wisconsin and the Wisconsin Conservation Commission to determine the extent of slashings, their inflammability and possibilities of control.

The investigation was made during the summer of 1930 and a report is now in the process of preparation. This is to serve as a basis for any possible future legislation.

The study extended to 16 northern counties in Wisconsin. The area covered by slashings was found to be a little over one half million acres or about 5 per cent of the nine northern fire protection districts. These are primarily hardwood slashings.

Ordinary slashings were found to be a menace for from six to eight years. Slashings are not the most inflammable fuels found in Wisconsin but fires once started in slash do burn hotter, are harder to fight and do more damage than other kinds of fires.

R. E. Marsh paid a short visit to the Station late in September and spent several days in the field with Cunningham looking over forest survey projects. After being told of the forest growth in our region slightly slower than that in the south where he had been just previously, after observing the recreational development slightly less advanced than that in parts of New England, and after forty miles through the Seney swamp and another long stretch across the sand plains of lower Michigan, he did not register great enthusiasm over the forest situation in the Lake States. We derive a little consolation from his remark that the one good thing he saw in the Lake States was our Sub-station at Dukes.

The cooperation with the State Land Economic Surveys in the three states in connection with the forest survey project had yielded during the 1930 season about 600 miles of strip somewhat according to the Swedish system.

Supplementing the growth data of the Forest Survey, some 50 miles of valuation strips from 1/2 to 1 chain wide were run through typical cut-over land that had been registered under the Wisconsin Forest tax law. The Wisconsin Conservation Commission provided financial cooperation for this project. On the basis of these surveys, it should be possible to predict the growth of the next fifty years and the amount of return which the state may receive on its investment. At the same time this growth study increases the growth data available for the region-wide forest survey project.

The forthcoming court action in connection with the watershed of the City of Seattle to settle the point whether forest cover affects the run-off of water and therefore whether the cover is a part of the watershed required two weeks of Zon's time for a preliminary survey of conditions. He has been called as an expert by the City of Seattle.

In addition to the details of permanent sample plot records and the measurements and the maintenance and improvement work at the Upper Peninsula Branch Station, a model logging camp has been constructed in the midst of the experimental forest for use during the seasonal logging operations and at other times by the station. This fall's cutting operation is well under way and will aim at an intermediate degree of selective logging, a flexible 17" diameter limit with emphasis on good silviculture.

The Upper Peninsula Development Bureau in northern Michigan published and distributed an attractive ten page pamphlet, "The Upper Peninsula Forest Experiment Station - What It Is and What It Does". The material was prepared by this station and includes many illustrations. Copies of this pamphlet together with five new technical notes were distributed to the station mailing list. The technical notes included - "Ground Vegetation - An Indicator of Forest Growth, More Light in the Forest?, By the Forest Ye Shall Know the Birds, Germination and Survival of Conifers under Aspen, Pre-treatment of White Pine Seed for Spring Sowing". A supply of "Second Growth White Pine in Wisconsin", Wisconsin Agricultural Experiment Station Research Bulletin No. 98 by Gevorkiantz and Zon, was also received and distributed. Technicians will find some interesting material on the relation between average diameter and number of trees per acre as a basis for rejection of plots and on the relationship between average height of dominant trees and total volume per acre in cubic feet. A preliminary exposition of a new method of constructing stand tables is also included.

The results of sowings of Norway pine seed in the Cass Lake Nursery in the spring of 1929, have shown that it is necessary to sow seed on a considerably larger scale in order to be sure of the 300-400 trees from each seed source needed for the field plantings that will be made. Therefore, since it is hoped to make complete and final sowings in this project (Bb-105) in the spring of 1931, - after which no new stock will be grown, - it became necessary to take advantage of a fairly good seed crop over the Lake States region to enlarge the original seed collections and to make a sufficient number of new ones to cover all parts of the range. The Norway crop in the East appears to be a complete failure this year, and no new samples to represent that region have been obtainable.

Both Bates and Holmberg were engaged upon seed collecting, which was forced upon us earlier than usual by the very dry summer and fall. Nearly all of the earlier collections have been amplified, while about 100 new ones have been added, making nearly 150 separate seed lots which will be available for sowing next spring. Michigan, Wisconsin and Minnesota are now amply covered to show the effect of latitude and variations in temperature upon the qualities of seedlings. Owing to the early opening of cones, very little attempt was made to collect spruce and white pine seeds for the projects on these species, which may perhaps best be left until the more active part of the Norway pine project has been disposed of.

Field plots for the expected plantings in this project next spring have been selected on the Huron, Superior, and Chippewa Forests leaving only a plot near St. Paul to be obtained. The last probably will not be needed immediately, and in fact the bulk of the available stock will be planted on the Chippewa next spring in order to work out the methods and problems which may be presented, as near as possible to the nursery.

In extension of the work done by Zon late last fall, in making a general survey of the needs and possibilities of forestry in North Dakota, Bates spent the early part of October in that State in an attempt to resolve the matter into more definite projects. His report, which will be prepared shortly, will recommend federal planting activity on an experimental scale in the sandhills of McHenry County, with the expectation of later developing a fair-sized forest unit; experimental planting for cover purposes and the prevention of erosion in the Bad Lands of western North Dakota, and a technical study of the advantages of windbreak planting on the plains. The first is by far the most important and will be strongly supported by local interests.

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NORTHEASTERN FOREST EXPERIMENT STATION

General

Behre made a trip to various sections of New York State with which he was not familiar. This trip included visits to the forest schools of both Syracuse and Cornell, attendance at the annual meeting of the Empire State Forest Products Association, at Watertown, and inspecting some of the experimental work being conducted by the New York State Conservation Commission.

Of particular interest was a large area of barren land which is developing in a belt along the western and northern margins of the Adirondack Mountains region. The soil in this belt is of light, sandy

character of sub-marginal value for agriculture. Although the land had been cleared and cultivated in the past, it is now largely abandoned, and following abandonment the vegetative cover has completely disappeared over considerable areas. The final stage in the breaking up of the vegetative cover is probably brought on by overgrazing. Pasture grass has given way to weeds and Polytrichum moss, and then this breaks up and permits the wind to start blowing the soil away. Scotch pine and red pine plantations can apparently be used to check the wind erosion, although by no means have all attempts at reforestation been successful.

Another interesting condition observed in portions of this belt was unusually stunted growth of white pine and spruce plantations. This condition is being studied by Doctor York and E. W. Littlefield of the New York State Conservation Commission, and although it has been suggested that frost was responsible for holding these trees back, Doctor York believes there is some relation to the depth of tillage and the presence of a former deep layer of podsol.

On October 22 and 23 Behre attended the conference of agricultural economists from the agricultural experiment stations of the twelve northeastern states in New York City. A report of this conference will include a statement of the need for studies of the marketing of forest products in the Northeast, and will recommend that studies of land utilization at the agricultural experiment stations be conducted in cooperation with the regional forest experiment stations. This meeting afforded an opportunity to observe how coordination of research by various agencies in the field of agricultural economics is being worked out. It should be helpful in guiding the activities of our Research Council which has for one of its major objectives coordination of research in forestry by all agencies in the Northeast.

At the close of the month Jensen completed all the field work which had been laid out in connection with the gypsy moth plots and other permanent sample plots which required remeasurement this year.

Forest Pathology

Early October was spent by Spaulding in a brief survey of slash on the Coastal Plain in Virginia and in the Pisgah National Forest. It was tentatively concluded that lopping of slash is of little effect in shortening the extreme danger period, as the small stuff which creates the most risk rots correspondingly fast as compared with Northeastern conditions. Danger of waterlogging, which greatly delays decay, certainly exists on the Coastal Plain and on the cooler slopes of the mountains.

Chestnut Replacement

Early in October Stickel remeasured the chestnut replacement plots on the Mount Toby Forest of the Massachusetts Agricultural College. In 1919 a white pine plantation was established on an area from which a heavy stand of blight killed chestnut had been removed. Permenent experimental plots were established in this stand in 1924. On one plot, the pines have been favored by cutting back all hardwood sprouts; on another, the plantation has been allowed to develop without treatment; and on the third plot which was established on a portion of the area where the dead chestnut is still standing, no plantation was made.

The pines have now reached the size where pruning should be commenced. On the treated quarter acre, 72 of the best trees were pruned for from one half to two thirds their total heights. The pruning removed an average of 28 branches on 6.3 whorls from each tree, producing an average clear length of 7.1 feet. The actual pruning work required about 2 minutes per tree. The pruning will be carried up the stem every few years until a 16 foot log has been cleared.

Fire Weather

The fire weather station at Smyrna Mills, Maine, was closed during the middle of the month, and the Elk Lake station was closed at the end of the month. Since housing difficulties will make it impossible to continue the Smyrna Mills station next year, and since the Elk Lake Station has now completed five years' records, this marks the end of the field work on the fire weather project.

Stickel has spent some time on the translation of P. E. Müller's book "Studien über die natürlichen Humusformen und ihren Einfluss auf Vegetation und Boden," but has continued to direct his major attention to the completion of the Cranberry Lake station data.

His correlation calculations indicate that evaporation is the most important factor in duff moisture, and that evaporation, hours since last rain and duff or air temperature account for practically all the variation which it will be possible to eliminate. Depression of the dew point shows up consistently as slightly superior to relative humidity as an indicator of duff moisture content.

Forest Biology

Miller's activities have been chiefly confined to examination of specific stands of white pine on which the weevil is being studied by Doctor MacAloney.

The number of species of birds found within the pure stands of white pine at this season of the year is limited, and judging from

the number of old nests found the pure stands do not appear to offer ideal sites for nesting birds. However, the activity of birds during other seasons of the year may be considerably different, and the activities of those found at this season may be decidedly important.

From several sections have come reports of considerable damage to white pine by the porcupine. The general opinion, however, seems to be that this mammal is apparently on the increase in a limited number of localities and should be held in check, especially where it is feeding on restricted plots.

After inspecting the damage done by the red squirrel, it is Miller's opinion that the terminal bud of white pine is eaten only when other food is scarce, and that extensive damage on the same areas rarely occurs in successive years.

Forest Entomology

MacAloney returned to the office about the middle of September. With the exception of one project all active field work has been terminated for the season. Examination of the white pine weevil permanent plots showed, as in previous years, the value of mixed stands as a means of reducing the severity of attack and injury. Some time has been spent on a cooperative study, with Mr. A. C. Cline, of the Harvard Forest, in the improvement of severely weeviled plantations, and it is believed a solution for the management of such stands has been obtained. Publication of the results of this study is expected in the near future.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The preparation of compilation forms, punch card forms and a code for use in studying the Region 1 fire records for the past ten years required most of Gisborne's time during the past month. Starting with conferences with Regional Office men, to determine their policies and objectives in the analysis of these data, early in the month, and continuing by a meeting at Berkeley attended by Show, Kotok, Reinecke, Brundage, McArdle, and Gisborne, forms were developed which permit using the 80-place punch card equipment. The present forms will include on one card all of the basic information, deemed of value, contained on the original fire report form, except a subdivision of acreage when the fire burned in more than one timber or fuel type. In such cases as many cards will be used for each report as there are

timber or fuel type acreages shown as burned. By grouping the items properly on the compilation sheets and cards so that the first 51 columns may be punched on the duplicator the preparation of the second and subsequent cards for any report has been greatly expedited.

A later problem, however, consisted of obtaining agreement among Regional Office men concerning the most efficient classes of time to use in coding discovery, report, get-away, and travel time statements. Provision has also been made to permit an easy sorting of the cards in an endeavor to find out why a Class B fire is delimited as 1/4 to 10 acres, and hence whether this is the most indicative classification that we could and should use. Kotok had suggested that phase of the study, but it was not readily provided for in the code devised at Berkeley. It was also found that there are many local and regional features of such an analysis which seem to demand a distinct code for each region. Not the least of these are the timber and fuel types, which it was not necessary to separate in the previous work done in California, but which demand distinctions in both Regions 6 and 1.

When this latter phase of the coding was attempted, in conference with Region 1 men, it developed that we have 10 major cover types, including brush and grass, and that the 8 timber types eventually must be separated into 22 distinct combinations. Furthermore, within any timber type experience recognizes 5 major fuel types consisting of Green Forest, Cut-over, Old Burn, Bug Killed, and Blow-Downs. And that these 5 types contain such distinct variations that at least 29 different degrees of fire behavior, hence hour control, should be recognized. This results in 638 possible (but not probable) combinations of fuel type and timber type.

It is not expected that the fire reports available are sufficient in number or detailed in description of type to permit obtaining satisfactory averages for each of these combinations. But it is unanimously agreed that when the records of 1931 to 1940 are analyzed an attempt should be made to study these so-called inflammability or fire-behavior types to the greatest refinement possible. By providing for this refinement now it will not be necessary to recode the 1921 to 1939 data ten years hence.

Final plans for the pursuit of this study of the fire records are partially contingent upon the plans for the transportation study (Norcross Plan) in this region, which is expected to get under way about the middle of November. The fire study undoubtedly will concentrate first on the group of forests containing those units first to be attacked by the transportation study.

The Regional Office is assisting very materially in the fire study by assigning one man, probably of Regional Forest Inspector grade, to supervise and co-ordinate the work from their viewpoint. In addition,

provision has been made to have each of the so-called fire forests detail to this study for a short period one of its more experienced fire assistants or deputies who will assist in coding and compiling the fire reports for his forest. The advantages of this procedure are obvious. It brings to bear an intimate knowledge of the local reports and their accuracy; it permits more corrections than would otherwise be possible; it is certain to speed up the work; and of great importance, it will result in at least one man from each important forest having a personal knowledge of and interest in this study and its later application in the field.

Haig and Field Assistant Fisher worked on a variety of permanent plot projects in the vicinity of the Priest River Branch. This included the first 5-year remeasurements of five normal yield plots, two understocked yield plots and two thinning plots, all of these installations being located on the Experimental Forest.

Perhaps the most interesting feature brought out by this work is the extremely rapid growth on understocked yield plots where trees are sometimes so widely spaced as largely to eliminate competition with their neighbors. Individual trees on these plots, which are in approximately 40-year-old stands, have grown as much as 1.5 inches in diameter and ten feet or more in height during the last half-decade. Another interesting item apparent in these measurements was the recovery and rapid height growth of understory cedar on the thinning plots. Here one of the major objectives of the thinning was to release understory cedar and stimulate its growth into timber of pole size when or shortly after the larger overwood trees become mature. Under these circumstances the present rapid height growth of these understory trees, now making commonly two to four feet in height per half decade where formerly their growth was a matter of inches, is very encouraging.

During the fore part of the month Haig and Fisher also re-established a ten-year-old plot laid out by J. A. Larsen in a shelterwood cutting on the Experimental Forest and installed two additional plots in the same vicinity. As a result of this work we now have within ten minutes' walk of the Experiment Station buildings a compact group of demonstration plots showing uncut overmature western white pine timber with adjacent light shelterwood, moderate shelterwood, and clear cut areas. As the shelterwood cuttings are 10 years and the clear cutting 20 years old, they show ocularly the effect of these various types of cutting upon seedling germination and survival conditions on the cut-over areas ranging impressively from little or no established reproduction under the moderate shelterwood (under two-thirds of the original shade) to excellent reproduction on the clear cut area within effective seeding distance of the seed plot.

Haig returned to Missoula after a four and a half months' field season to begin office compilation and report writing. Fisher remained at Priest River to take up and sort out of the duff seed installed in

our seed storage experiments. The mere sorting out of this seed is now a considerable task taking at least two man weeks. Some of this seed has now been stored in the duff for three years. Germination tests to determine its present viability will be run during the coming year, a 300-day period in the sand bed having been found necessary to obtain satisfactory data on western white pine.

Dr. Karl M. Müller visited the Missoula office several times during October while spending about a week in this vicinity in his study of climatic races of lowland white fir. His fresh viewpoint on many of our problems proved interesting and stimulating and we were glad in our turn to be able to supply him with height-diameter measurements on lowland white fir from several localities and a variety of sites throughout the northern Idaho region.

Thompson reports from Priest River that October rains and snows have improved the water situation materially. Due to the cumulative lack of normal rainfall during the past two years the Priest River Station water supply was in imminent danger of disappearing with the first hard freeze. If November is favorable, however, it now seems probable that water will be easily obtainable throughout the winter.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

A visit from Mr. R. E. Marsh was an outstanding event of the month. Much of his time was devoted to the Forest Survey and the forest insurance study.

The Director attended the Logging Congress which was an unusually pleasant and successful meeting of some three hundred lumbermen and others. This year's Congress was unique in that the delegates lived on a charted boat for four nights for a trip from Seattle to British Columbia and back, two full days being spent ashore in Victoria for the formal sessions.

Another interesting meeting of the month was the Society of American Foresters entertainment of the State Foresters Association at a dinner meeting in Longview where five State Foresters spoke most interestingly of the work in their varied regions. The Station was well represented.

A committee has been appointed on experimental forests and ranges in accordance with the recent instructions under Regulation L-20. The committee consists of Munger, chairman, McArdle, Kavanagh, Horton, Ames,

and Hanzlik. This committee will supersede the former committee on virgin timber reservations and will also take over the selection of natural areas.

A circular received from the Seattle Weather Bureau Office stating that Mr. J. Bernhard Melin, Assistant Meteorologist, formerly of the San Jose, California office has been selected to fill the position made vacant by the untimely death of George W. Alexander, Fire Weather Specialist for Washington.

Natural Reproduction of Douglas Fir

Isaac spent the first half of the month on leave at his home in Wisconsin. On his return he made the final examination of the natural reproduction plots and seed tree survival areas at Westfir, Oregon, and also at the Wind River Branch Station at Stabler, Washington. As elsewhere in the region, the seedling mortality was found to be high, and at Wind River several Douglas fir seed trees were found dead after having survived the logging for a period of 10 years.

The duff storage tests of Douglas fir seed that gave no germination after the first year when the first series of tests was made and very light germination after the first year when the second series was made, were again repeated this year. Ten soil or duff containers were prepared, each having 1000 sound seeds placed respectively in the surface litter, at a 1-inch depth and at a 2-inch depth making a total of 30,000 seeds. Five of the containers were set in the soil in a rodent proof inclosure under virgin timber and five in an open slash burned area. Each spring one container will be taken up from each location and the seeds tested for germination.

Western Yellow Pine Growth Study

In reconstructing the sizes of trees for past decades on the temporary plots taken in the growth and yield study of western yellow pine, the most difficult and uncertain adjustment is for height growth. It is a necessary adjustment, however, since a respectable portion of the volume growth depends upon the estimate made for shoot growth. Many volume tables show roughly a change of one per cent in volume for each foot increase in height. Any effort to reconstruct sizes should therefore tend to conservatism. Unlike some of the other conifers, the height growth of western yellow pine can be only poorly approximated by the number of whorls. Especially in the older trees is this true. The following procedure was used in the Pacific Northwest study to make the necessary adjustments. An ocular estimate of height growth was made in the field on each tree measured. This indicated in a way whether the tree had a top showing fast, medium, slow, or no development. In addition, about 180 sample trees of all ages and sizes were climbed or

felled and borings taken clear into the tops. Such analyses allowed a fairly accurate interpolation of the various height stages. The height growths of these sample trees were grouped and plotted in several ways, each of which contributed in helping to adjust the ocularly estimated heights. The first plotting showed the height curve at time of cutting and the height curve at time of measurement. In all the localities tested, the height curve at time of cutting seemed to lie approximately ten feet above the present height curve, indicating that the release in diameter growth was not paralleled by increased height growth, resulting in a shifting of the curve to the higher diameter classes. When the trees were divided into 20-year age groups and averages obtained showing the height growth per inch of diameter growth and also height growth per decade after release, very well defined curves were obtained. It is true that there was a considerable variation of the single height points around this curve, but the average points fell remarkably smoothly. When grouped by the Dunning tree classes, these same height values showed less definite relationships. The best criterion seemed to be that of height growth per inch diameter growth plotted over age tempered by the ocular estimate and by the translation of the height curve. With a tendency towards conservatism, this procedure can be effectively used in adjusting the heights for the desired periods.

Methods of Cutting - Western Yellow Pine

Early in the month Kolbe examined the reproduction transects on the four Crater plots and made a check of the seed crop of each reserve tree. The results of the reproduction survival are most disappointing in that not a single subsequent seedling is to be found on the plots. These four areas have passed three seasons since cutting, and this is the first season that the reserve trees have borne more than just a few cones. In 1928 the uncut stand and also some of the reserve trees on earlier cuttings in the near vicinity of these plots produced quite a supply of seed, while the trees left on the areas cut over in 1927 were conspicuous for their lack of it. This year, the plot on which only a scattering of dominant mature yellow pines were left as a reserve had just twice as many trees with a full crop of cones as the other three plots together. The latter had a stand composed mostly of young thrifty trees.

Ames and Ericson of the Regional Office, and Munger joined Kolbe on the Malheur Forest to assist in the marking of the four new methods of cutting plots. This "marking board" which also included Ewing, Waterbury, Koenig and Cory of the Malheur Forest treated the four plots as follows:

Plot #2 - A selection cutting in which the oldest and poorest trees are to be removed to such an extent as to give a reserve stand without large openings with the purpose of having a uniform stand in which each tree is given release.

Plot #3 - Adjoining Plot 2, was marked following the standard practice. This will make possible a comparison between the two methods.

Plot #4 was marked with the idea of a light cut and a short cutting cycle. The cut consisted mostly of the oldest and poorest trees or those that were poorly spaced for best growth conditions. This ten-acre plot is situated on a north slope and favorable for the growth of Douglas fir.

As the area surrounding the plot will be cut according to the standard method, this plot will show to some extent the effect of a heavy overwood on the encroachment of fir reproduction on this site.

Plot #5 is to exemplify the so-called economic or value selection method. The object here is to remove only about 50 per cent of the volume of the stand and mostly those trees that have the highest quality material and leaving for the next cut many of the mature trees.

The difference in logging costs and value of the product will be carefully studied along with the possibilities of growth for each method of cutting. With these new plots on the Malheur, the Station now has under observation 278 acres for this project.

The subsequent reproduction on the three Whitman plots was checked late in the month. The 1929 light crop that germinated this spring gave us on an average a survival of 5 seedlings per acre this fall. The seedlings that germinated from 1914 the year of the cutting to include the 1929 survivors now average 984 seedlings per acre. A year ago this average was 1106, the loss mainly due to drought.

Fire Studies

McArdle, with Gisborne, visited Berkeley where conferences were had with Show, Kotok, and Reineke on the proposed analysis of fire reports. McArdle reports this trip one of the most worth while in his Service experience. A marked stimulation of fire studies already is noticed which may be attributed directly to the visit. These personal contacts yield more in a few days than could be obtained in a year of letter writing.

After returning from California, McArdle and Gisborne went to the Wind River Branch Station for several days. Following Gisborne's departure for Missoula, McArdle made tests to compare the behavior of the sticks used as indices of fuel moisture content. Over 60 of these sticks are now ready for use next season. Most of the sticks are 2 inches in diameter, but a number are 1 inch and ½ inch in diameter and a few are 3 inches and 4 inches in diameter. Sticks square instead of round in cross section have turned out to react about the same as the round sticks. A noteworthy feature of these sticks of Douglas fir

sapwood is that, size for size, they respond to changes in atmospheric moisture very uniformly. Twenty 2-inch sticks, for example, rose and fell in moisture content with less difference between values for the individual sticks than usually is obtained with several hygrometers, hygrographs, thermographs or anemometers also running side by side. McArdle has sent Gisborne a Douglas fir stick to be placed at Priest River and Gisborne is sending us one of his white pine sticks.

McArdle is investigating the possibilities for using a dial type scale for much of the weighing now done on the small "add-a-weight" scales of the Harvard trip type. A scale with dial reading to 1000 grams by tenth-grams would fit most of our needs in weighing large numbers of fuel samples, soil samples, etc. Not only would these scales save time in weighing, but the direct-reading dial feature would prevent the mistakes commonly made in counting up a number of individual weights. And speaking of scales, we find the triple beam scales manufactured by the Welch Scientific Company, 1516 Orleans Street, Chicago, to be better for our purposes than the Harvard type trip scales. These Welch scales carry their own weights on three beams; have an accuracy of 0.2 gram with 200 gram load; a capacity to 610 grams (with an extra attachment, to 1110 grams); and cost $12.00 each. ($9.00 in quantity).

Wind River Branch.

Simson spent a large part of the month on annual leave. While away he spent some time discussing fire weather and climatology reports with Keyser and Crombie of the Spokane Weather Bureau Office. He also spent half a day with Garrett of the Walla Walla Weather Bureau Office.

The bulk of the work since Simson's return has been in winding up the Branch Station activities for the year, such as inventorying the arboretum nursery stock, stowing gear, putting the buildings in shape for the winter, drying down fuel samples and making the final observations of the year.

Forest Insurance

On October 2, Shepard and assistant finished the field work on the recent fires of Marion County, Oregon, and October 7 commenced on Clatsop County, doing the field work on two burned areas - the Crown Willamette 1929 fire and the Humbug 1928 fire. Both of these yielded some useful material, particularly the Humbug fire in that it demonstrated the greater relative seriousness of ground fires in old growth stands in the Coast Range type as compared to the Cascade region. This is mainly due to the larger proportion of hemlock in the stand and to the presence of Sitka spruce. Neither of these species resists damage from ground fires effectively because of their thinner bark as compared to Douglas fir.

After determining that the fires in the neighborhood were not suited to this study because of the small areas burned outside of very recent cuttings and also because of the serious disturbance of the evidence of the damage due to subsequent logging operations, the study was extended to Tillamook County, where two burned areas were worked near Battersom and two adjacent burned areas on the Salmonberry. All of these burns yielded useful material.

Next Shepard moved near the east line of Tillamook County but found that the burned area listed there was useless for this study because of the practically complete obliteration of the evidence of the damage by subsequent logging. The working up of the figures is nearly completed.

Forest Survey

Lage Wernsted has taken airplane pictures of a large portion of the Suislaw National Forest and also part of the privately-owned lands in Clackamas County, Oregon, and Island and San Juan counties, Washington. These are oblique pictures which show a considerable area of country with about 1½ to 2 land office sections of land in the foreground shown in detail. The point at which the picture is taken and the direction of the view is plotted on a base map on which is also shown the flight path of the ship. Rangers and other forest officers are then sent the photos and the base map and they plot the exact location of all known points on the prints. The prints with the known points spotted are then given the field mappers who use them as guides in determining the boundaries of types. The particular status of the type as regards species age and stocking is determined by ground work, the photo serving more as a guide in marking type boundaries.

Field work for Yamhill county has been completed this month, and Buell, Briegleb, Kemp[illegible] Bolles are well along on the private land in Polk, Marion, Benton and Lewis counties, respectively. Another national forest, the Rainier (west side only), has been completed so far as field work is concerned.

Girard, Pratt, and Kline have made good progress in checking the cruises obtained from private sources and the county cruises in one county in both states.

General

Two men joined the Station's Staff in October: W. G. Wahlenberg, Associate Silviculturist, returned to the Station following a period of 18 months spent in California with the Eddy Tree Breeding Station, and will be assigned to pine management studies. Henry Bull, Assistant Silviculturist, reported for work on the hardwood growth and management studies. Bull was formerly connected with the Connecticut Agricultural Experiment Station. J. D. Diller, Field Assistant, is assigned to the Starke Office for the new study of the effects of fire on naval stores yields.

Among the many visitors who stopped at the Station during October to acquaint themselves with our work, were two Mexican lumbermen, Jose de la Macorra and his son. Mr. Macorra was a delegate to the Inter-American Conference on Agriculture, Forestry and Animal Industry in Washington and is now visiting the various forestry regions of the United States. These men visited Starke and Bogalusa as well as the New Orleans office.

Mensuration

Wahlenberg, Pessin, Winters, Bull, Coile, and Genth spent about two weeks at McNeill, Mississippi making a valuation survey of 1500 acres of cut-over longleaf land, which is being proposed as an experimental forest area. Included in this tract are the 640 acres which are now under lease by the Station for experimental work in timber growing and cattle grazing.

Meginnis, Cruikshank, and Genth made a valuation survey of a proposed virgin longleaf pine area within the Kisatchie National Forest Unit in northwest Louisiana.

Forestation

Wakeley and Winters examined a slash pine plantation established in March, 1926 near Elico Tower, Jackson County, Mississippi. On a part of the plantation which was burned over January 4, 1930, they found an average mortality of 37.7 per cent as compared with an average mortality of 29.5 per cent on the unburned area, and an average height of 11.2 ft. as compared with the 12.4 on the unburned part.

Management

Wakeley and Winters visited an area, in Greene County, Mississippi, which is being protected from fire by a private owner. The owner is

keeping out fire because he is interested in growing timber, improving his woodland pasture, and providing cover for quail.

Naval Stores

The regular chipping for the season has been finished. Preparations have been made to gather the scrape crop and to make remeasurements on many of the trees which are being worked out this year.

Harper, Rudolf, and Miss Chamberlin devoted considerable time in making computations for the gum weather factor correlations. The results, so far, have shown that average temperature is by far the most important weather factor influencing yield. It has also been found that the weather conditions during the first day of chipping determine to a large extent the yield for the week (streaks were put on once a week). The practical application of this, labor and economic conditions permitting, is that streaks should be put on during warm sunny days and no chipping should be done on cold rainy days.

Heyward has completed a report on the recent extensive survey trips made to study possible locations for a fire and naval stores yield study. These trips have shown the extent of forest fires in the Southeast, for only a few areas were found that have not been burned over in a period of ten years, and most of these areas are small tracts near buildings.

Protection - Others

Dr. Pessin completed a progress report on the experimental work in timber growing and cattle grazing which has been carried on at McNeill, Mississippi since 1923.

Hardwood Growth Study

Lentz, Winters, Bull, and Coile, in cooperation with the Mississippi Forest Service, made a survey of about 300 acres of second-growth hardwoods in Tunica County, Mississippi, situated between the levee and the Mississippi River on so-called batture land. The area has been logged over repeatedly and practically the only standing timber is of unmerchantable quality. The survey was made to determine what forestry measures should be used in managing the tract. The State Forester of Mississippi plans to have this area serve as an example for land having similar conditions and the recommendations made in this case will presumedly be passed on to other owners of severely logged, Delta hardwood land.

Erosion

Lentz and Sinclair were in the office from October 1st to October 13th working up reports on their previous trips. Several articles based on the erosion studies have been prepared for publication. The October 5 Sunday issue of the Memphis Commercial Appeal carried a feature article on erosion by Lentz, and resulted in a considerable number of inquiries asking for further information.

The extent of erosion in Benton and DeSoto Counties, Mississippi, was estimated with a crop-meter. During the study in DeSoto County the logging operations of a large hardwood company were visited where caterpillar tractors were being used. The operation was along the bottom of the Coldwater River, where overflow occurs after each heavy rain. The eroded lands of Marshall County drain into the Coldwater and heavy deposition has taken place there in the hardwood bottoms. In some places trees were buried 3 to 4 feet and much valuable timber has died as a result of the sediment deposited around them.

En route to Mississippi, Lentz and Sinclair visited Thomas' "Cave" some 10 miles north of Fulsom, Louisiana. This "cave" is nothing more than a badly gullied area some 2 acres in extent. Red and yellow sands have eroded to a depth of 50 to 60 feet. The erosion which has caused this gully started at a spring some 40 years ago. The present owner charges 10¢ per person admission to the area and on Labor Day over 50 automobiles drove into the place. This is the first case the erosion crew has found where the owner of a gully has been able to make money on it.

Financial Aspects of Forestry

The men assigned to the Economic Survey spent the entire month in the office, in writing reports.

Dr. Ziegler revised for publication the Appling County, Georgia Report and the Washington County, Florida Report. On October 11th Dr. Ziegler gave a radio talk over Station WWL, New Orleans, on "The Costs and Returns of Pine Timber Growing in the South". The data obtained in the Lee County, Alabama study were used by Dr. Ziegler for an article "Where and When Does Timber Growing Pay?", which will appear in an early issue of Quarterly Agricultural Bulletin of the Georgia Railroad Company and Association.

Spillers and Reynolds started to write the report of the Economic Survey of Bradford County, Florida. Bradford County is representative of the counties in the northeastern part of the state, and in that belt of flat-woods land extending south from the Okefenokee Swamp in Georgia. At least 95 per cent of the area of the county is in the Flatwoods Soil Region. About three-fourths of forest land in this flatwoods area is supporting second-growth stands of longleaf pine, and about one-fourth

is in slash pine "ponds". There is probably a higher percentage of slash pine in the forests of this section than in any other county in the inland part of Florida.

Bradford County was cut over for lumber between 1880 and 1915. In the early logging operations only the large sound trees were removed. Numerous seed trees were accidentally left to seed up the area. Today there is an excellent stand of young second-growth timber on most of the forest land in the county. Growth is rapid. One natural stand was found which is 16 years old from seed and is supporting 204 turpentine cups per acre. The average diameter at breast height of this stand is 8.4" and the average height is 56'.

Natural conditions offer every opportunity for private forestry in Bradford County, but economic conditions at present are prohibitive. Unimproved land is taxed 55¢ per acre per year.

Pathology

Lindgren, Chapman, and Scheffer dismantled the last of the experimental piles of lumber treated with various antiseptic solutions for the prevention of sap stains and molds in southern woods. A group of representative mill men in the South were present at the time of the examination of the material at one of the large mills in southern Louisiana. A very efficient control was accomplished by several of the treatments and several of the mill men expressed the belief that these treatments should have a wide field of application in the South. Four log treatment experiments directed at the control of deteriorating agencies in stored logs were initiated at operations located in Louisiana and Mississippi.

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SOUTHWESTERN FOREST AND RANGE EXPERIMENT STATION

Forest Management

Two sample plots near the Fort Valley field station were remeasured during the month. One of these is in a virgin stand of western yellow pine, and is expected to give interesting data in comparison with cut-over plots. Incidentally the open spaces in this area have almost completely restocked following the curtailment grazing during the past fifteen years. The reproduction is now mostly of 1914 and 1919 origin. It is going to be interesting to observe the effect, if any, of this young growth upon the increment of older trees as root competition develops.

A thinning plot on the Prescott was also remeasured. This plot, comprising 4 acres thinned and a control area of 1 acre, was established in 1925. The thinning was largely an improvement cutting, removing wolf trees and other undesirable specimens; but considerable numbers in all crown classes were also removed in order to improve spacing. The stand averages about 40 years old, there are 400 trees per acre ranging mostly between 5 and 12 inches dbh., and the height of dominants is around 35 feet. Although the measurements have not been compiled, it is evident that a substantial increase in diameter growth has resulted from the thinning. Increments ranging from 0.6 to 1 inch in diameter in 5 years are common. Of especial significance are the excellent ground surface conditions. Save for occasional small openings the soil is evenly covered by a mat of needles about 2 inches thick. Herbaceous vegetation even after thinning is very scanty. Surface runoff originating within the plot is practically nil. In a few of the larger openings on slopes, small gulleys have started, but they invariably stop when they enter the pine thickets. Because of uneven distribution of trees, the area is not a perfect thinning plot; but it is an excellent demonstration of what can be accomplished in timber growth and in soil protection by maintaining a fully stocked stand.

Range Research

Cooperrider is at Fort Valley directing the final field examinations for the season. On account of his prolonged absence from the office and the responsibilities in connection with the recent Supervisors' meeting at Roosevelt, an adequate report on range work can not be submitted at this time. Mention should, however, be made of the Roosevelt meeting, October 22 - 29, which was primarily a demonstration to Forest Supervisors and other administrators of the results of Cooperrider's work on the relations between grazing and erosion. Other members of the research organization who attended this meeting were Chapline, Pearson, Culley and Campbell. Among the important facts brought out by Cooperrider are the following:

There is normally a great annual fluctuation in the density of grasses due to variations in precipitation. On areas exposed to overgrazing the current fluctuations in density have a general downward trend, whereas on moderately grazed or totally protected areas the trend is upward.

Abnormal erosion can be controlled by establishing a ground cover. Where a few perennial grass roots remain and the soil has not been depleted restoration of cover under protection is fairly rapid, but where the grass is practically gone and where the soil has been removed or impoverished by erosion, recovery will be very slow.

On browse ranges it was convincingly demonstrated that although shrubs afford good protection to the soil under their immediate influence, the total space occupied is usually too small to afford adequate protection to an entire area. If, for example, the clumps of brush cover only 25 per cent of the ground surface and the intervening spaces are not occupied by grasses or other vegetation, water courses will wind about between brush clumps down a slope and may form gulleys of large proportions. The remedy is to graze so that a grass cover will be established and maintained in the spaces between clumps of brush.

The same principles of restoring grass and other herbaceous vegetation hold in the woodlands. In the Pinon-Juniper type, areas were shown on which gulleys formed between the trees were so deep that the trees, themselves, were being undermined or killed by the exposure of roots and excessive drainage of water. Surface loss of soil on slopes was so severe that numerous shrubs had their roots exposed for several inches.

Jornada Experimental Range

Chapline spent ten days during the early part of the month in considering the three Jornada manuscripts which have been worked up this year. The grazing capacity manuscript is developing slowly but surely, and final checks of 1930 data have been included to bring the material as far up to date as it is planned to go. Campbell's paper on clay soils succession, and Canfield's report of the clipping studies are both in the editor's hands and Chapline took time to check both papers from the technical viewpoint.

Chapline and Campbell spent a day in showing Chester Gray, Washington representative, and L. E. Freudenthal, member of the Board of Directors of the American Farm Bureau Federation, over the Reserve, and included a trip to Elephant Butte Dam. During the trip, the relation between vegetative cover and erosion was well demonstrated by the contrast between the Reserve and the uncontrolled public domain.

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[illegible] ACTIVITIES [illegible]

Activity at Fremont during the first week of the month was mostly of administrative routine nature following Reeser's return from the Nebraska Forest, and the early closing of the Mt. Manitou Incline which demanded the prompt and urgent consideration of details pertaining to the

laying in of supplies and equipment at the field station. During this time, the western yellow pine cones collected on the Nebraska trip were placed in the drying shed to season. At the end of the month a goodly number of these cones were still unopened and gave little promise of yielding a seed crop. Evidently the western yellow pine cone crop of the plains country was not only poor in quantity but also in quality.

Roeser met Dr. Glen G. Hahn of the Office of Forest Pathology, and accompanied him to the Douglas fir thinning area in Jarre Canyon on the Pike Forest for the purpose of examining again the so-called pitch-girdle disease of sapling Douglas fir.

This visit and examination was attended with no more luck than were past visits by members of the same office. Dr. Hahn was especially interested in finding a casual organism which induces the formation of cankers, being on the look-out specifically for a Dasyscytha fungus, which is intimately associated with the cankerous condition prevailing on Douglas fir trees in certain New England plantations. However, no casual organism of fungus nature was found and it is not entirely impossible that a physiological, rather than a pathological, condition is involved.

It was decided to continue the observations begun several years ago by which a complete record of the occurrence and history of the disease will be obtained in the four experimental thinning plots in Jarre Canyon for which periodic growth measurements are procured. More attention will be directed toward signs indicating the presence of the disease in the incipient stage on and near the base of branches. Information of such nature is desired in order to obtain information now lacking concerning the time factor in the development of the canker.

Returning from Jarre Canyon, time was taken to stop at the Monument Nursery where fall counts were made of the 2-1 western yellow pine breeding stock which is being raised here to obtain better trees. A series of destructive hail-storms in August left its mark on this stock, chiefly in the form of dead trees rather than in mutilated stock. The heaviest damage, peculiarly enough, was inflicted upon the larger stock representing the progeny of seed trees at the lowest level of western yellow pine's range around Pikes Peak. Approximately 1/3 of this stock was killed. Loss, in general, however, was considerably less than this.

Planting Assistant Schrader's comments in regard to the 1930 growth of Douglas fir in the Pikes Peak Region are of interest in the light of previous statements which have been made in these pages concerning this phenomenon. The killing of Douglas fir buds last winter and spring he found to be general on all classes of stock and in all age classes of trees. On older trees the percentage of such loss was observed to have been almost 100% and very few new shoots and leaders were developed on trees near the Monument Nursery, which is 7200 feet high. In nursery stock, the killing of terminal buds was followed in the development of new growth from one to several adventitious buds surrounded each dead terminal, so that the single leader is replaced by a whorl of indefinite leaders, producing a rather undesirable tree. This condition has been so general this year as to be almost typical of this year's development.

At Fremont, most of Roeser's time was given to the fall observations in Douglas fir, western yellow pine and lodgepole pine source of seed and heredity test plantations; to remeasuring seven one-acre plots in the western yellow pine type on the experimental demonstration forest (which, incidentally, yielded some rather surprisingly large figures, 1 - 1½", in diameter accretion for this species during the past five years), and to mapping and measuring two additional plots, one cut-over and one virgin, which are thus added to the experimental forest list of study plots. Observations in the type study at fourteen field stations were continued to the close of the month, which was very open by virtue of only 2.3" of snowfall, permitting of the procuring of an uninterrupted series of observations on soil surface temperatures.

During the month, a Ranger was detailed to porcupine control work within the Pikes Peak plantations which lie within a short distance west of the Fremont Field Station. It is understood that this detail will last until about December 1, since porcupines are becoming increasingly active and propagating rapidly. Their depredations within the experimental forest lately have been the cause of considerable concern.

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Bates, C. G., and O. R. Zeasman	Soil Erosion - a local and national problem. (Wis. Agr. Expt. Station Res. Bul. No. 99)
Forbes, R. D. and Donald Bruce	Rate of Growth of Second-growth southern pines in Full Stands. (Dept. Cir. 124).
Forbes, R. D.	Timber Growing and Logging and Turpentining Practices in the Southern Pine Region. (Tech. Bul. 204)
Haig, I. T.	A Quarter Century of Silviculture in the Western White Pine Type. (The Forestry Kaimin, 1930)
Hill. C. L.	1929 Lumber Cut of California and Nevada. (The Timberman, Oct. 1930)
Lowdermilk, W. C.	Review of "Factors Influencing Run-off and Soil Erosion," by A. B. Connor and R. E. Dickson. (Jour. of For. Nov. 1930).
Kotok, E. I.	Fire, a problem in American Forestry. (Scientific Monthly, Nov. 1930)

Kraebel, C. J.	Review of "Report of the Forestry Bureau, Los Angeles City Schools" by F. M. Fultz and W. R. Tanner (Jour. For., Nov. 1930)
Krauch, Hermann.	Review of "New Experiments to Determine the Influence of Root Competition and Shade from the Overwood on the Younger Undergrowth," by L. Fabricius, Univ. of Munich. (Jour. of For., Nov. 1930).
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Lentz, G. H., J. D. Sinclair and H. G. Meginnis.	Soil Erosion in the Silt Loam Uplands of Mississippi. (Jour. For. Nov. 1930)
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Meyer, W. H.	Diameter Distribution Series in Even-aged Forest Stands. (Yale Univ. School of Forestry, Bul. 28).
Meyer, W. H.	A Study of the Relation Between Actual and Normal Yields of Immature Douglas Fir Forests. (J.A.R.Nov. 1930).
Wahlenberg, W. G.	Effect of Ceanothus Brush on Western Yellow Pine Plantations in the Northern Rocky Mountains. (J.A.R. Oct. 15, 1930).
Wijkstrom, S.	Sample Plot Method of the Minnesota Land Economic Survey for Determining Growth and Yield. (Jour. For. May, 1930).

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MANUSCRIPTS

SOUTHERN

Preliminary Report on the Influence of Commercial Fertilizers on the Gum Yield and Growth of Slash Pine, by V. L. Harper.

APPALACHIAN

Wild Life in the Great Smokies. (Radio talk by T. D. Burleigh.)

OFFICE OF FOREST PRODUCTS, Region 1

Logging and Milling

During the past month the Office of Products furnished Logging Engineer Neff with information covering certain phases of a paper on "Tractor Logging" which he presented at the Pacific Logging Congress held at Victoria, B. C., from October 22 to 25, inclusive. Most of the data were compiled from yellow pine tree studies made by this office during the past two years. Mr. Neff did not attempt a discourse on tractor logging methods and costs of same, but made a very able presentation of the striking comparisons obtained by the use of graphs in analyzing tractor output. The use and need of tractor out-put studies was also very clearly shown in his talk.

There are two methods of tractor logging most widely used in this region; they are skidding in tree lengths and in long-log lengths (24' - 40'). The graphs comparing these two methods show a striking difference. Felling, limbing and topping trees plus bucking at the landing versus felling, limbing, bucking and topping in the woods were the first steps of the two methods to be compared. On a tree diameter basis the comparison by volume output per effective hour is all in favor of felling, limbing, bucking and topping in the woods. This is also true from a cost standpoint. For instance, trees 24" d.b.h. can be felled, limbed, bucked, and topped for 56¢ per M contrasted to 68¢ per M for felling, limbing and topping plus bucking at the landing. The difference is 12¢ per M. The volume difference in output for 24-inch trees is 130 feet per effective hour in favor of the long-log system.

Now let us consider skidding under the two methods. Again, the long-log system shows up to a better advantage, but not so decisively as in the previous comparison. It is apparently cheaper to use the tree-length system of skidding for trees from 12 to 18 inches in size, but above that diameter the long-log system of skidding shows the cheapest. Since the average tree in most of our yellow pine stands is over 18" d.b.h. and the majority of trees moved are over 18" d.b.h., it appears that the long-log system of tractor logging is the most economical.

Selective Logging

Field work on the study to determine the growth in the western yellow pine type 39 years after a partial cutting was completed during the month. Associate Forester I. V. Anderson assisted by Rangers Robb and Austin of the Missoula Forest and field assistants Wm. Ibenthal and Ed. Dobrinz made a detailed survey covering 280 acres. A detailed stump analysis and reproduction count was made by 1/5-acre units on strips 5 chains apart using a plot interval of 2 chains. All advance growth was taped and tallied from 4" d.b.h. and upward by one-inch diameter classes.

Compilation of the data has already started and it is expected that Mr. Anderson will have completed the analysis project report by February 1, 1932. It is planned to publish the report in some trade journal providing the A.C.M. Company will consent. There is some question on that score since the Company has promised to furnish us with original cost, detailed carrying charges and logging costs for the area studied. Such information pertaining to a specific company is usually considered confidential, but if such is the case the information will at least be available for Service use.

Mr. R. E. Marsh Visits Region One on Inspection Trip

R. E. Marsh, Assistant to the Chief of Branch of Research, spent the week of October 7 to 13 in the Region One Office going over the work in Forest Products and Silvicultural Research with members of the Products Office and Northern Rocky Mountain Experiment Station staffs. On October 10 Mr. Marsh and Mr. Bradner visited Mr. Anderson and his crew on the growth after partial cutting study up the Big Blackfoot Valley. Mr. Marsh was particularly interested in the trip up the Blackfoot River as he had gone over the same route some 20 years ago as a member of a reconnaissance crew. According to Mr. Marsh, the country didn't look quite the same. Mr. Marsh left on October 13 for Portland.

Visitors

Mr. Blalock, of the Seattle Office of the Department of Commerce, visited this office for a short time on October 6. Mr. Blalock is making a study of exports. Some exchange of ideas and information was made.

Dr. Karl Müller, Bavarian Forester, visited the office on October 17. Dr. Müller is making an intensive study to find the best possible climatic race of Abies grandis (white fir) to meet the needs of Bavaria and southern Germany. Considerable information relative to the supply, annual cut, products and properties of white fir was given Dr. Müller. Dr. Müller was much interested in the properties, grades, etc., of white fir lumber to supplement his silvicul studies.

Mr. Nils P. Fornander, Chief Forester, Uddeholms, Aktiebolag, Uddeholm, Sweden, was a visitor at this office on October 28, 29, and 30. Mr. Fornander was making a study of the equipment and methods for handling and transporting small timber and was particularly interested in loading equipment and methods. Accompanied by Mr. I. V. Anderson, Mr. Fornander visited the woods operation of the Geo. Harper Lumber Company up the Bitterroot Valley. On this visit an opportunity was afforded to study both tractor and horse skidding, trailing in chutes and loading. Mr. Fornander was much interested in the logging output and woods and mill studies. He also obtained a number of photographs illustrating logging equipments and methods.

The Uddeholms Aktiebolag of which Mr. Fornander is forester owns 600,000 acres of land divided into 10 forest administrative districts. The Company operates sawmills, pulp and paper mills, charcoal burners, iron mines and foundries. A sustained annual cut of 210 million board feet is made. Utilization is very complete. In addition to lumber, fuelwood and paper, charcoal, resin, artificial silk, ether and ethyl alcohol are also products.

Lumber Prices & Movement

Av. Mill-Run Prices	Annual, 1929	1st Q., 1930	2nd Q., 1930	July, 1930	Aug., 1930	Sept. 1930
Idaho White Pine	$34.44	$35.33	$34.28	$33.51	$33.04	$34.86
Western Yellow Pine	26.17	24.57	23.29	19.71	19.44	18.70
Larch-Fir	20.29	18.35	18.28	16.90	16.59	15.58
White Fir	20.94	19.45	18.45	16.45	16.64	14.42
Spruce	24.23	23.51	22.76	21.19	21.22	19.44

Shipment and Cut	1929	1930
Shipment	141,842	118,368
Cut	152,561	113,479

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OFFICE OF FOREST PRODUCTS - Region 6

Washington Visitor

Mr. Marsh spent a few days in the Office, reviewing the work done and that in prospect.

Spelman on Leave

Because of illness Spelman was granted six months leave. We all hope that health will return to him in the very near future.

Minor Timber Products Study

Johnson prepared an outline for a study of the industries producing minor timber products in Oregon and Washington, including poles, piling, masts, spars, hewed ties, hewed timbers, round and split fence posts, shingle bolts, cooperage bolts, excelsior bolts, forest firewood, forest pulpwood, veneer blocks, mine timbers, tanbark, cascara bark, etc.

The plan is to conduct the study with considerable care, with practically all angles of the several industries investigated; including production and consumption, imports and exports, organization of industries, operating methods used, costs and prices, kind and quality of timber used, stumpage values, transportation, distribution, specifications, utilization standards, converting factors, etc.

The purpose of the study is:

1. Collect information that will supplement Bureau of Census and other available statistical data with particular regard to the needs of the forest resource survey.

2. Determine the extent to which minor timber products serve or can be made to serve as a means for utilizing so-called wood waste; this study is really a phase of the general wood waste study now in progress.

3. Determine the extent to which second-growth timber is used for minor timber products, together with the advantages and disadvantages of such utilization.

4. Collect information that will assist in the conduct of the cooperative work with the Bureau of the Census, such as the preparation and correction of directories, the confident preparation of questionnaries, the interpretation of data submitted by reporting companies, etc.

5. Add to the general fund of Forest Service information, and to that extent aid in the conduct of Forest Service work, whether administrative or research.

6. Add to the general fund of available information, to the end that the Forest Service will be better equipped to supply information to the public on request.

Bureau of Census Work

Reports from seven companies were transmitted to Washington during the month, bringing the total to 2127.

A tabulation of the results of the survey shows that Oregon and Washington produced 12,020,459 thousand feet of lumber in 1929 (Oregon 4,772,363 thousand and Washington 7,308,096 thousand) as compared to 12,000,974 thousand in 1926. On this basis the lumber cut of these two states in 1930 was slightly larger than any previous year.

Survey of Sawmill Waste in the Douglas Fir Region

Hodgson, with a crew of eleven men, spent the last half of the month in making sawmill waste studies in four Douglas fir sawmills in

western Washington. This phase of the survey, which is being handled in much the same way as that in the hemlock sawmills last February, will be continued in November until six representative Douglas fir sawmills are completed. The crew consisted of Johnson and Hodgson of the Office of Products, Stevenson of the Office of Forest Management, Anderson and Maclay of the Olympic, Raprager of the Snoqualmie, Strange and Jacobson, lumber graders of the West Coast Lumbermen's Association and three laborers picked up locally at the mills studied.

Splendid cooperation is being received from the cooperating companies, the management manifesting considerable interest in the study.

The work in the field was inspected by Marsh and Gibbons.

Progress has also been made with the office work. The data from several hundred questionnaries submitted by the industry which deal with the production and present utilization of sawmill waste, including the sale value of the products made from it, have been tabulated in preliminary way by Mrs. Johnson and Miss McPhail. The returns indicate that some of the larger and more favorably located mills are each receiving from $100,000 to $400,000 per year from the sale of commodities made from sawmill waste.

Felling and Bucking

As a result of the illness of Spelman the field work on this project was shortened by several weeks. During the month Johnson devoted several days in the office to the data collected the past summer.

Pacific Logging Congress

Gibbons attended the Congress, presenting a paper dealing with the felling and bucking study which Products is conducting in the Douglas fir region. C. L. Mullen of San Francisco delivered an interesting paper on "Unseen Costs in Felling and Bucking", stressing the importance of careful supervision in that department of the logging operation. Considerable discussion followed the reading of Mr. Mullen's paper, with the result that the problems involved in log making were pretty well reviewed.

The Pacific Logging Congress, organized in 1909 at Seattle, has grown to be one of the most important bodies in the logging industry, and since its organization it has witnessed many changes in the methods of logging.

The annual meeting of this year was held at Victoria, B. C., the several sessions being devoted to ways and means for remeding some of

the ills besetting the logging industry of the Pacific Coast States and the Province of British Columbia. The subjects included in the program included every phase of logging, including a discussion of selective logging in the Douglas fir region by Axel Brandstrom of the University of Washington.

Grading Red Alder Logs

In connection with a recent visit to the Love Furniture Company, Olympia, Washington, Johnson found that this concern is now grading all red alder logs purchased. This is the first attempt, so far as is known, to establish log grades for this species. Mr. Love stated that the poor quality and small size of many of the logs delivered at the mill had forced his company to the practice of purchasing logs on a log-grade basis.

The grades with reference to 10-foot lengths are as follows:

No. 1 logs shall be over 10 inches in diameter at the small end, straight, and free from large live knots; a few small black knots are permitted.

No. 2 logs shall be 10 inches and less in diameter at the small end and sound, but will permit crooks, also live and black knots of any size.

Purchasing their logs from nearby farmers, the company pays $12.00 per thousand for No. 1 logs and $10.00 for No. 2 logs.

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North Carolina Project

Wager returned from additional field studies in North Carolina, and spent the last part of the month at the New Haven office. The results of Hollerith tabulations for Beaufort County were received from the Washington office. Most of the office computations connected with the study of assessment ratios were completed under the direction of Thomson and Miss Day.

National Tax Association meeting

Fairchild was absent from the office for the week beginning October 20 attending (unofficially, so far as the Inquiry is concerned) the annual meeting of the National Tax Association at Kansas City. Forest taxation was not specifically treated at this meeting, but contacts useful to the Inquiry were made or maintained.

Studies of special forest tax legislation

Hall was out of the office part of the month engaged in field work on this project. He covered the State of Massachusetts and has prepared an office report. Herbert left just before the close of the month to make a similar study in Vermont.

Progress reports

One progress report was distributed to the mailing list this month; Number 9, entitled "Property Taxation in Selected Towns in the Forest Land Regions of Minnesota" by R. C. Hall and P. A. Herbert. The final draft of a new progress report, Number 12, entitled "Assessment Ratios of Forest Property and Other Real Estate in Wisconsin" by R. C. Hall was completed and sent to Washington for multigraphing. This report shows that there is marked discrimination against cut-over lands in assessment practice, and that the process of equalization between towns and cities does not in general tend to mitigate this discrimination but in many cases increases it.

Herbert has been working on two progress reports dealing with tax conditions in Michigan, and Pingree on reports covering detailed studies in Wisconsin and the Pacific Northwest.

Forest Taxation in Europe

Nieuwejaar has completed his assignment on this subject, his appointment terminating at the end of this month. He has completed office reports dealing with taxation of forest lands in Switzerland,

Finland, and Germany. In order to insure the completion of these reports before the expiration of Nieuwejaar's appointment, Pingree has been assisting him in their preparation.

Final Report

DeVries has been chiefly occupied with his assignment on the factual part of the final report, and has completed a tentative draft of one section.

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